

VARIATIONS OF THE WATER TEMPERATURES OF THE ATLANTIC OFF THE FRENCH COAST.

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[Abstracted from *Comptes Rendus* (Paris Acad.), Nov. 14, 1921, pp. 923-925.]

In carrying out the program of the Committee on the Atlantic Plateau, appointed by the International Council for the Exploration of the Sea, divers cruises were made this summer (1921) off the coast of France between Spain and Ireland. Sufficient observations have been made to reach the specific conclusions concerning the Atlantic waters from point of view of temperature.

The continental plateau, from the entrance of the English Channel, is covered with cold water, the continuance of the waters of the north of Europe which represent there the mean or normal waters; their temperature on the bottom varying little from 9° to 12° C. at the maximum. From December to April these waters are spread out in stable, isothermal sheets.

In summer, from May to November, an important "transgression" of the warm waters is produced, localized in upper layers down as far as 60 meters. Below 60 meters, the layers of water can not be said to be affected by this warm extension, their temperature being 11° on the continental plateau and 12° outside the plateau.

The depth where the "transgression" is best marked is at 50 meters. Rounding Cape Finisterre, the sheets at a temperature of 17° to 18° force themselves into the Gulf of Gascony, between 45° and 46° N. Toward the north, this sheet forms three large expansions which infringe on the edge of the continental plateau: (1) In the region southwest of Ireland, 50° N.; (2) to the east of the bank of the Petite Sole, as far as 49° 20' N.; (3) to the southwest of Penmarch. The cold waters of the plateau find themselves thrown back and canalized.

Between the second and third warm "transgression" is found a sheet of water, the length of Parson's bank, which

is flattened out toward the south, outside of the plateau, as far as 46° N. The same phenomenon has been found off the Spanish coast in longitude 7° W. On this meridian a veritable "cold sill" is formed whose width does not exceed 60 miles.

Thus, on the French continental plateau at a depth of 50 meters the summer transgression of the warm waters from three pockets is limited by the cold waters of this plateau, which they throw back and force to spread out in two points.

The order of things in the channel is entirely different from these waters of the Atlantic, observations leading to the belief that the former and the North Sea are closely connected.

The great variability of temperature in the Channel is in contrast to that of the Atlantic waters of the continental plateau, and a barrier of cold water, which extends from Ouessant to the Scilly Islands, forms a veritable separation between the Atlantic waters and those of the Channel.

The phenomena which we have cited are constant, they are susceptible to variation, but the general principle remains the same, observations made the past two years confirming this.

In looking at this group of phenomena from the point of view of general hydrography, we must consider that the continental plateau at the entrance of the Channel corresponds to the banks of Newfoundland on the American coast, in the sense that it is the seat of a marked opposition of warm and cold waters. This opposition is more intense on the American coast in consequence of the large accumulations of cold water coming from the icebergs and the warm water coming up from the Gulf of Mexico, than on the coast of Europe, but the correspondence phenomenon of the two Atlantic coasts, nevertheless, remains complete.—G. F. H.